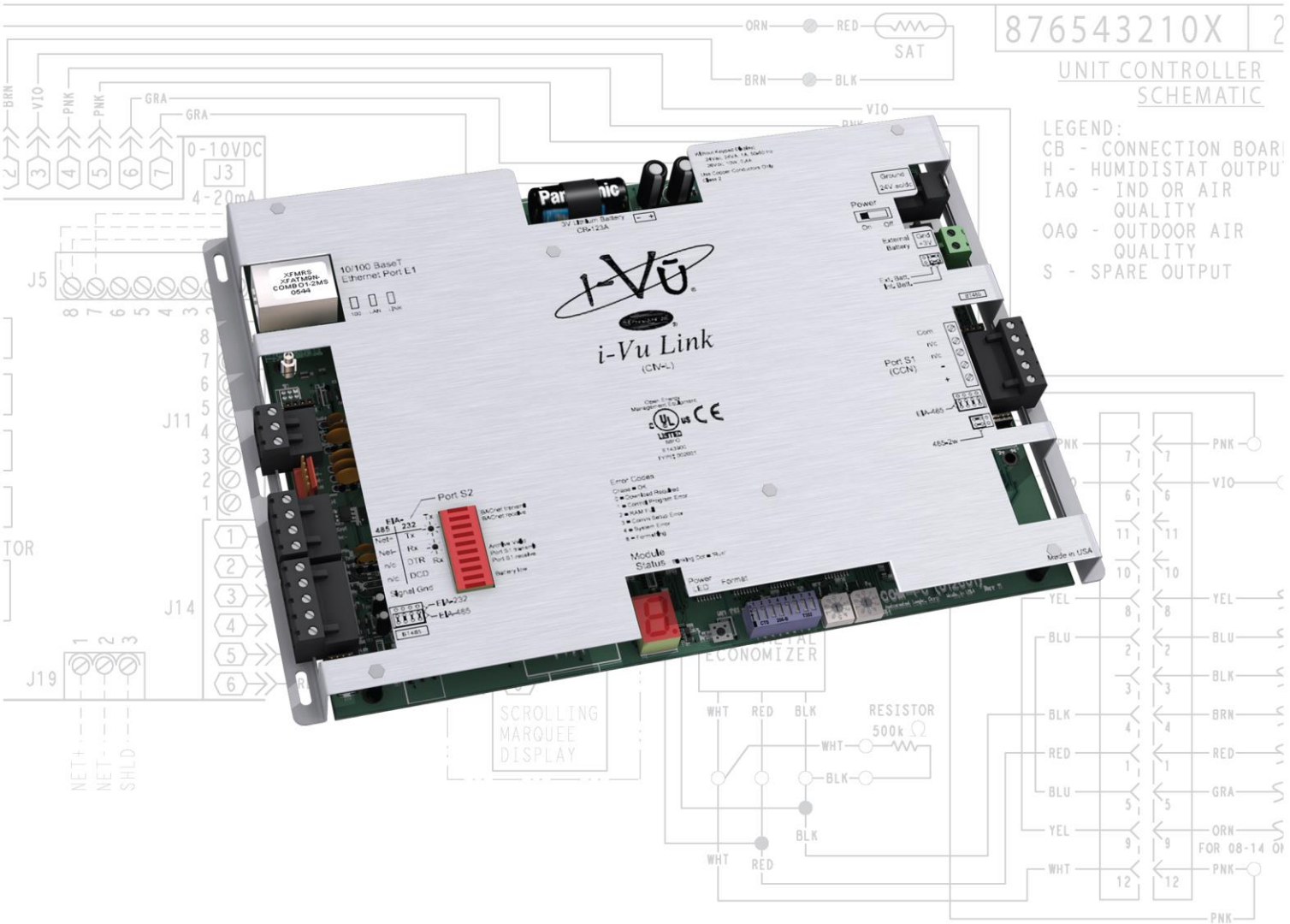
i-Vu® Link
Installation Guide



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 Verify that you have the most current version of this document from **www.hvacpartners.com** or **www.accounts.ivusystems.com** or your local Carrier office.

Important changes are listed in **Document revision history** at the end of this document.

Contents

Introduction

What is the i-Vu® Link?

The i-Vu® Link is an integral part of the i-Vu CCN Plus/Pro system. It has all of the capabilities of an i-Vu CCN Router, plus it can integrate with other manufacturer's equipment. Support for BACnet, Modbus, and LonWorks® protocols are standard.

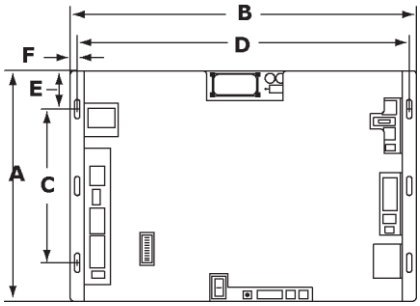
The i-Vu® Link has one EIA-485 port for connecting to the CCN bus and one jumper-configurable EIA-232/EIA-485 port for connecting to a third party network. It also has one 10/100Base-T Ethernet port for connecting to the building LAN and/or other third party TCP/IP networks.

Each i-Vu® Link can connect to up to 140 CCN devices and supports up to 500 integration points. The i-Vu® Link also stores trend data and time schedules for the CCN devices that it is connected to.

NOTE The rotary switches are not used on the i-Vu® Link for addressing the router's BACnet Device Instance or IP.

Specifications

Module drivers	drv_ivulink_modbus drv_ivulink_lon
Maximum number of CCN controllers	140
Maximum number of third party points	500
Power	24 Vac ±10%, 50–60 Hz, 24 VA 26 Vdc ±10%, 10 W
Communication ports	10/100 BaseT Ethernet **Port E1**: LAN, BACnet IP, and/or Modbus TCP/IP communications **Port S1**: 5-pin EIA-485 for CCN Network and/or CCN Service Tool connection (9600 and 38400 baud) **Port S2**: Configurable EIA-485/EIA-232 for third party network connections, including: • BACnet MS/TP @ 9600, 19200, 38400, and 76800 baud • Modbus (RTU and ASCII modes) @ 9600, 19200, 38400, and 76800 baud • LonWorks (requires SLTA-10 adapter) @ 38400 and 76800 baud
Microprocessor	32-bit Motorola Power PC microprocessor with cache memory, Fast Ethernet controller, high performance 32-bit communication co-processor
Memory	16 MB non-volatile battery-backed RAM (with 12 MB available for use), 8 MB Flash memory, 32-bit memory bus NOTE Shelf life of battery is 10 years with 720 hours of continuous operation.
Battery	10-year Lithium CR123A battery ensures the following data is retained for a maximum of 720 hours during power outages: • Time • Graphics • Control programs • Editable properties • Schedules • Trends To conserve battery life, you can set the driver to turn off battery backup after a specified number of days and depend on the archive function to restore data when the power returns. A low battery is indicated by the **Battery Low** LED or a low battery alarm in the i-Vu CCN Plus/Pro application, a touchscreen device, and Field Assistant.
Real-time clock	Battery-backed real-time clock keeps track of time in event of power failure

Protection	Built-in surge and transient protection for power and communications in compliance with EN61000-6-1. Incoming power and network connections are protected by non-replaceable internal solid-state polyswitches that reset themselves when the condition that causes a fault returns to normal. The power and network connections are also protected against transient excess voltage/surge events lasting no more than 10 msec. **CAUTION** To protect against large electrical surges on serial EIA-485 networks, place a PROT485 at each place wire enters or exits the building.
Status indicators	LED status indicators for EIA-485 CCN communication, Ethernet port communication, and low battery status. Seven segment status display for running, error, and power status.
Environmental operating range	-20 to 140°F (-29 to 60°C), 10–90% relative humidity, non-condensing NOTE i-Vu® Link must be mounted within the building envelope.
Storage temperature range	-24 to 140°F (-30 to 60°C), 0 to 90% relative humidity, non-condensing
Physical	Rugged aluminum cover, removable screw-type terminal blocks
	
Overall dimensions	A: 7-1/2 in. (19.1 cm) B: 11-5/16 in. (28.7 cm)
Mounting dimensions	C: 5 in. (12.7 cm) D: 10-7/8 in. (27.6 cm) E: 1-1/4 in. (3.2 cm) F: 1/4 in. (.6 cm) Mount with 6-32 by 1/2 in. mounting screws
Depth	2-3/4 in. (7cm)
Weight	1.4 lbs (0.64 kg)
Listed by	UL916 (Canadian Std C22.2 No. 205-M1983, CE, FCC Part 15 - Subpart B - Class A

Safety considerations

WARNING Disconnect electrical power to the i-Vu® Link before wiring it. Failure to follow this warning could cause electrical shock, personal injury, or damage to the controller.

Mounting and wiring

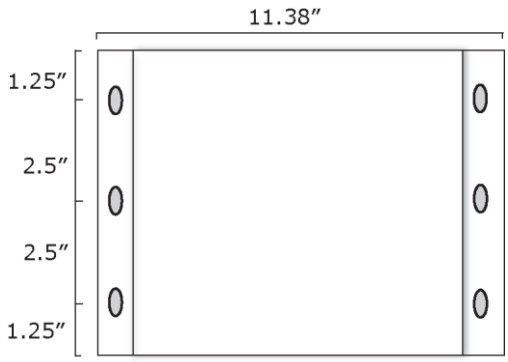
To mount the i-Vu® Link

WARNING

When you handle the i-Vu® Link:

- Do not contaminate the printed circuit board with fingerprints, moisture, or any foreign material.
- Do not touch components or leads.
- Handle the board by its edges.
- Isolate from high voltage or electrostatic discharge.
- Ensure that you are properly grounded.

Screw the i-Vu® Link into an enclosed panel using the mounting slots on the cover plate. Leave about 2 in. (5 cm) on each side of the controller for wiring.



To wire for power

1. Make sure the i-Vu® Link's power switch is in the **OFF** position to prevent it from powering up before you can verify the correct voltage.
2. Remove power from the power supply.
3. Pull the screw terminal connector from the router's power terminals labeled **24 Vac/Vdc** and **Ground**.
4. Connect the transformer wires to the screw terminal connector.
5. Apply power to the power supply.
6. Measure the voltage at the i-Vu® Link's power input terminals to verify that the voltage is within the operating range of 21.6 – 26.4 Vac or 23.4 - 28.6 Vdc.
7. Insert the screw terminal connector into the i-Vu® Link's power terminals.
8. Turn **on** the i-Vu® Link's power.
9. Verify that the Run LED (a dot in the lower right corner of the **Module Status** LED) begins blinking. The **Module Status** LED will display **8** for about 5 seconds and then reverts to **0,** until controllers have been found and downloaded. There is a chase pattern when the router is running with no errors.

To wire CCN devices on Port S1

1. Turn off the i-Vu® Link's power.
2. Check the communications wiring for shorts and grounds.
3. Verify that the **Port S1** 485/232 jumper is set to **EIA-485** (left side) and the 2/4 jumper to **485-2w** (right side).
4. Connect the i-Vu® Link's **Port S1** to the CCN bus. Use the same polarity throughout the network segment.

Wire this Port S1 terminal...	To this CCN device terminal...
Signal Ground (Pin 5)	**G**
Net- (Pin 2)	**-**
Net+ (Pin 1)	**+**

NOTE The CCN Shield should be tied/taped back or daisy chained if the i-Vu® Link is not at one end of the bus.

To wire a third-party device

1. Turn off the i-Vu® Link's power.
2. Check the communications wiring for shorts and grounds.
3. Wire the i-Vu® Link's Port S2 to the third-party device, then set the S2 jumper. See table and notes below.
4. Turn on the i-Vu® Link's power.

For...	Use i-Vu® Link port...	Wire Carrier terminal...	...to third-party device terminal	Set the port's jumper(s) on i-Vu® Link
EIA-232	S2	TX Rx Signal Ground	Rx Tx Gnd	EIA-232
EIA-485, 2-wire	S2	Net+ Net-	+ -	EIA-485 2-wire

NOTES

- If you cannot determine the media type or connections of the third-party device, contact your third-party representative.
- Use the same polarity throughout the network segment.
- Repeaters are required for more than 31 devices. See your third-party device manufacturer's recommendations.
- To reduce communication and data errors, terminate each end of an EIA-485 network with a resistor whose value equals the network's characteristic impedance. Some third-party manufacturers provide a built-in resistor that you enable or disable with a jumper. Make sure that only devices at the end of a network have termination enabled.

  EXAMPLE If an EIA-485 2-wire network's characteristic impedance is 120 Ohms, terminate one pair by placing a 120 Ohm resistor across the **Net+** and **NET-** connectors of the i-Vu® Link. Terminate the other pair by placing a 120 Ohm resistor across the **+** and **-** connectors of the furthest third-party controller.
- A solid receive light on the i-Vu® Link indicates a wiring or polarity problem.

Configuring IP for the i-Vu® Link

The i-Vu® Link must be commissioned using Network Service Tool on **Port S1**.

1 Use **Network Service Tool V** (NST V) to connect the i-Vu® Link directly into Port S1, which is designated for CCN communications.

2 Upload the i-Vu® Link (Default CCN Address 0, 1).

NOTE After uploading the controller the CCN address should be changed to something other than 0,1. This avoids addressing conflicts when uploading Carrier equipment into the i-Vu application. When using NSTV the CCN address can be changed by highlighting the i-Vu® Link and then clicking on the Display/set properties icon.

3 Access the **Service Configuration Table** IP_CONF to enter the following configuration options:

NOTE A static IP address is required, as DHCP is not supported.

- **Host IP Address** - enter the device manager's IP address, provided by the LAN administrator (allowable entries for xxx.xxx.xxx.xxx: xxx is a decimal number between 0 - 255)
- **Subnet Mask** - enter the device manager's IP address, provided by the LAN administrator (allowable entries for xxx.xxx.xxx.xxx: xxx is a decimal number between 0 - 255)
- **Default Gateway** - enter the IP Gateway's IP address, provided by the LAN administrator (typically a router on the Ethernet LAN).

CCN ENET Configuration

Device Type -

- Select **0** for **Gateway** if the converter connects the primary CCN Bus (Bus 0) to the Ethernet. Toggle the spacebar to select **0**.
- Select **1** for **Bridge** if the converter connects a secondary CCN Bus to the Ethernet. Toggle the spacebar to select **1**. The CCN Element number of the CCN Bridge becomes the CCN secondary bus number assigned to controllers residing on the network.

NOTE You can only have one Gateway per system.

If configured as a Bridge:

- **CCN/Ethernet Gateway Address** - enter the IP address of the i-Vu® device manager that is configured as the CCN Ethernet Gateway. This is the same address that was entered in the Host IP address for the CCN Gateway. (Entries are allowed for xxx.xxx.xxx.xxx:xxx are decimal numbers between 0 - 255.)

NOTE When the device manager is configured as the Gateway, it ignores the CCN/Ethernet Gateway IP address. In this case, leave the CCN/Ethernet gateway address at its default setting (0.0.0.0.).

4 Repeat the above steps for each i-Vu® device manager used in the CCN system.

Troubleshooting

If you have problems mounting, wiring, or addressing the i-Vu® Link, contact Carrier Control Systems Support.

NOTE To help you troubleshoot, obtain a Module Status (Modstat) from the controller and review the System Error and Warning details.

Formatting the i-Vu® Link

CAUTION This erases all archived information and user-configuration settings. You will have to reconfigure all custom settings. It is recommended to restore the factory defaults only under the guidance of Carrier Control Systems Support.

To erase volatile memory data and restore factory default configuration settings:

1. Turn **off** the i-Vu® Link's power.
2. Hold down the i-Vu® Link's **Format** button while you turn its power on.
3. Continue to hold down the **Format** button until the module status LED displays **8** and then **0**, then release the button.
4. Sets the Bus and Element number to 0, 1, which must be reverted using the Network Service Tool.
5. In the i-Vu CCN Plus/Pro interface, select the i-Vu® Link in the navigation tree, go to the **Downloads** page and **Download All Content** to download the control programs, drivers, and parameters.

LED's

The LED's indicate if the i-Vu® Link is speaking to other devices on the network. The LED's should reflect communication traffic based on the baud rate set. The higher the baud rate, the more solid the LED's will look.

The **Module Status** LED can display the following error codes.

Error Code...	Indicates...	Possible solutions
0	The controller is not downloaded.	1 In the i-Vu CCN Plus/Prointerface, select the router in the navigation tree, go to the **Downloads** page and click **Download All Content**.
1	A custom equipment error	Obtain a Module Status Report (Modstat) and look for error conditions.* If you cannot determine the error from the Modstat, send a screenshot of the Modstat to Technical Support. ***NOTE** To obtain a Module Status Report in i-Vu CCN Plus/Pro, click the menu button, then select Manual Command and type in "modstat".

Error Code...	Indicates...	Possible solutions
2	The i-Vu® Link's memory is full	In the i-Vu CCN Plus/Pro application, reduce the amount of trend data being stored in the module.
3	A setup error	Verify that the IP address has been set through Network Service Tool. See *Configuring IP for the i-Vu® Link* (page 7).
4	A system error	Obtain a Module Status Report (Modstat) and look for error messages. If you cannot determine the error from the Modstat, send a screenshot of the Modstat to Carrier Control Systems Support. **NOTE** To obtain a Module Status Report in the i-Vu CCN Plus/Pro interface, click the **Main Menu** button, then select **Manual Command** and type in `modstat`.
8	The i-Vu® Link is formatting	The number 8 should display only during the short formatting period. If this number displays continuously or flashes intermittently with another number, try the following options: • Turn the i-Vu® Link's power off, then on. • Format the i-Vu® Link. See *Formatting the i-Vu® Link* (page 8). • Download memory to the i-Vu® Link. • Replace the i-Vu® Link.

Other LED's show the status of certain functions.

If this LED is on...	Status is...
Power	The i-Vu® Link has power.
Link	The controller is connected to the Ethernet
LAN	The Ethernet port is transmitting or receiving data
100	The connection speed is 100 Mbps. If LED is not lit, the connection speed is 10 Mbps.
CMnet transmit	The i-Vu® Link is transmitting data over the CMnet
CMnet receive	The i-Vu® Link is receiving data from the CMnet
Archive Valid	The i-Vu® Link's memory backup is valid
Port S1 transmit	The i-Vu® Link is transmitting data from **Port S1**
Port S1 receive	The i-Vu® Link is receiving data on **Port S1**
Battery low	The battery is low

To replace the i-Vu® Link's battery

The i-Vu® Link's 10-year Lithium CR123A battery retains the following data for a maximum of 720 hours during power outages: time, control programs, editable properties, schedules, and trends.
To conserve battery life, you can set the driver to turn off battery backup after a specified number of days and depend on the archive function to restore data when the power returns.
A low battery is indicated by the **Battery low** LED or a low battery alarm in the i-Vu CCN Plus/Pro application. You can purchase replacement batteries from any retailer that sells a CR-123A battery.

1. Verify that the i-Vu® Link's power is on.
2. Using a small flathead screwdriver, pry up each side of the black battery clip until it is free and you can remove it.
3. Remove the battery from the controller, making note of the battery's polarity.
4. Insert the new battery into the controller, matching the polarity of the battery you removed.
5. Push the black clip back onto the battery until you hear both sides click in place.
6. Download the i-Vu® Link.

Compliance

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

CE Compliance

WARNING This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

BACnet Compliance

Compliance of listed products to requirements of ASHRAE Standard 135 is the responsibility of BACnet International. BTL® is a registered trademark of BACnet International.

Document revision history

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
1/20/21	Configuring the IP for the i-Vu® Link	Added note to step 2 of NSTV about changing the CCN address to avoid conflicts Specified CCN ENET Configuration Device Type numbers to use.	C-TS-JN-E
1/20/21	What is the i-Vu® Link?	Added note about rotary switches.	C-TS-JN-E
1/24/19	Specifications	Added surge CAUTION to Protection specification.	X-TS-AK-E-CC
10/26/18	Specifications	Reworded Protection specification and added first paragraph.	X-H-JS-O
8/6/14	Configuring the IP for the i-Vu® Link	Corrected the Network Service Tool procedure by adding CCN ENET Configuration.	C-TS-RD-E

* For internal use only

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